71-

Highway Safety Literature

An Announcement of Recent Acquisitions. . .

HSL No. 71-8 February 26, 1971 HS-008 585 - HS-008 619, HS-800 315, HS-800 319, HS-800 324 - HS-800 328, HS-800 365 - HS-800 366

HSL No. 71-8
February 26, 1971

THIS ISSUE CONTAINS:

U.S. Department of Transportation / National Highway Traffic Safety Administration

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INTRODUCTION

Publications announced in *Highway Safety Literature* include the most recent additions to the collection of the NHTSA Scientific & Technical Information Service. Subject areas covered include all phases of highway, motor vehicle, and traffic safety, especially those encompassed by the National Traffic and Motor Vehicle Safety Act of 1966 and the Highway Safety Act of 1966.

Individual issues of *HSL* are numbered according to the year and the issue number within that year; thus, 71 designates the year and 1, 2, 3, etc. the individual issues. To aid the user in location citations by the HS-number, the cover bears the inclusive entry numbers for each issue.

Entries in *HSL* are arranged according to the revised NHTSA Subject Category List shown in the Table of Contents. The List is a two-level arrangement consisting of five major subject fields subdivided into 58 subject groups. Documents related directly to the National Highway Traffic Safety Administration (NHTSA) are announced in a separate section headed NHTSA DOCUMENTS and are numbered in five distinct series: NHTSA Accident Investigation Reports (HS-600 000 series), NHTSA Compliance Test Reports (HS-610 000 series), NHTSA Contractors Reports (HS-800 000 series), NHTSA Staff Speeches, Papers, etc. (HS-810 000 series), and NHTSA Imprints (HS-820 000 series). For NHTSA DOCUMENTS in series HS-600 000 and HS-610 000, individual full case reports are available for inspection at the National Highway Traffic Safety Administration; or for purchase from NTIS (see page ii). Although announced together in a separate section, these documents are also assigned specific subject categories for machine retrieval.

A document which contains a number of separate articles is announced as a complete volume in the subject category most applicable to it as a whole. Entries for the individual articles appear in their most specific subject category.

SAMPLE ENTRIES

Subject Category Array

NHTSA Accession no..... HS-800 218 Fld. 5/21; 5/9

Title of document..... AN INVESTIGATION OF USED CAR SAFETY STANDARDS--SAFETY INDEX: FINAL REPORT. VOL. 6 - APPENDICES G-L

Personal author(s)..... by E. N. Wells; J. P. Fitzmaurice; C. E. Guilliams; S. R. Kalin; P. D. Williams

Corporate author..... Operations Research, Inc., Silver Spring, Md., O15000 ← For computer use only

Collation

Publication date..... 12 Sep 1969 150p
Contract FH-11-6921
Report no. ORI-TR-553-Vol-6; PB-190 523

Abstract..... Appendices G-L to this study of used car safety standards include: indenture model diagrams for classes I-IV motor trucks; degradation, wear, and failure data for motor truck classes I-IV; and safety index tables for classes I-IV motor trucks.

Search terms: Wear /Trucks; Failures /Trucks; Used cars; Inspection standards /Trucks; Inspection standards /Data

AVAILABILITY: NTIS

HS-004 497 Fld. 5/19

AUTO THEFT–THE PROBLEM AND THE CHALLENGE

by Thomas A. Williams, Sr.

Journal citation . . . Published in *FBI Law Enforcement Bulletin* v37 n12 p15-7 (Dec 1968)

Gives figures on the extent of the auto theft problem and comments on antitheft devices available now or in the planning stage.

Search terms: Theft, Theft protection, Stolen cars

NHTSA SUBJECT FIELDS AND GROUPS

* All Federal Motor Vehicle Safety Standards apply to passenger vehicles. An asterisk before a subject group indicates additional types of vehicles to which the indicated standards may apply.

NOTE: Material published in Highway Safety Literature (HSL) is intended for the information and assistance of the motor vehicle and highway safety community. While brands names, equipment model names and identification, and companies may be mentioned from time to time, this data is included as an information service. Inclusion of this information in the HSL should not, under any circumstances, be construed as an endorsement or an approval by the National Highway Traffic Safety Administration, Department of Transportation of any particular product, course, or equipment.

Harry A. Feinberg
Managing Editor

AVAILABILITY OF DOCUMENTS
AND
INSTRUCTIONS FOR ORDERING

Department of Transportation personnel may borrow copies of publications directly from the NHTSA. Outside the Washington, D.C. area, phone (202) 426-2768. In Washington, D.C. area, use government ID, phone 118-62768. Non-DOT personnel should contact their company or agency libraries for assistance.

Journals cited may be obtained through most research libraries.

Contractors' reports and other documents can usually be obtained as indicated under AVAILABILITY. However, there is no certainty that retention copies will be available for more than a limited period after a document is issued.

The more common distribution sources are identified by symbols which are explained below:

NTIS: National Technical Information Service (formerly Clearinghouse for Federal Scientific and Technical Information–CFSTI), Springfield, Va. 22151. *Order by accession number: HS, AD, or PB.* Prepayment is required by NTIS (CFSTI) coupon (GPO coupons are not acceptable), check, or money order (made payable to the NTIS). PC (Paper copy; full size original or reduced facsimile) $3.00 up; *MF* (microfiche approximately 4x6" negative sheet film; reader required) $0.95.

GPO: Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Give corporate author, title, personal author, and report number. Prepayment is required by GPO coupon (NTIS [CFSTI] coupons are not acceptable), check or money order (made payable to the Superintendent of Documents).

HRB: Highway Research Board, National Academy of Sciences, 2101 Constitution Ave., N. W., Washington, D C. 20418.

NHTSA: National Highway Traffic Safety Administration General Services Division, Washington, D.C. 20591 (Telephone (202) 426-0874).

SAE: Society of Automotive Engineers, Dept. IISL, 2 Pennsylvania Plaza, New York, N.Y. 10001. Order by SAE report number. Prices given are list; discounts are available to members and sometimes to libraries and U.S. Government Agencies. Prepayment is required; orders without payment are subject to a $1 handling charge.

IMPORTANT

WHEN REQUESTING a document, to be absolutely sure you receive what you order, give the accession number (HS, PB, AD number) or report number (in cases such as an SAE document), title of report, and the personal or corporate author (whichever is cited). When requesting an HS-numbered document from NTIS (CFSTI), add DOT/ to the prefix HS-; example HS-800 000 should be ordered as DOT/HS-800 000.

SPECIAL NOTICE

NEW PRICES FOR DOCUMENTS AVAILABLE FROM NTIS

On January 1, 1971, the National Technical Information Service (NTIS) increased the prices for documents in certain categories. These increases were made necessary by increased costs. Prices are now as follows:

PAPER COPY

Most documents announced after January 1, 1969, are priced:

1 to 300 pages	$3.00
301 to 600 pages	6.00
601 to 900 pages	9.00
Over 900 pages	Exception Price

Two years after announcement, documents having 300 pages or less will have a service charge of $3.00 added to the announced price. No service charge will be added for documents over 300 pages.

Documents announced prior to January 1, 1969, have a service charge of $3.00 added to the announced price.

MICROFICHE

Microfiche reproduction of documents on a demand basis are priced at 95 cents per document.

Documents available on Standing Order through NTIS Selective Dissemination of Microfiche Service (SDM) are priced at 35 cents per document.

1/0 ACCIDENTS

1/1 Emergency Services

HS-008 585 Fld. 1/1

EMERGENCY SERVICES. AN EMERGENCY DEPARTMENT RECORD FORM

by Charles F. Frey

Michigan Univ., Ann Arbor. Medical Center, M41950

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p313-26

6 refs

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

The design and considerations which we conceived important in developing an Emergency Department record responsive to the needs of hospital and community planning of The University of Michigan Medical Center are reviewed here.

Search terms: Emergency medical services /Michigan Univ. Medical Center; Medical records; Medical case reports /Accident causes

AVAILABILITY: *In* HS-008 596

1/2 Injuries

HS-008 586 Fld. 1/2

SPLENECTOMY FOLLOWING ABDOMINAL TRAUMA

by Robert C. Andersen; Dean B. Pratt; Claude R. Hitchcock

Hennepin County General Hospital, Minneapolis, Minn., H08650

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p301-11

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

Splenic injury is common following abdominal trauma secondary to vehicular accidents. This injury should be suspected if the patient shows signs of shock or abdominal injury, especially to the left side of the trunk. Splenic injury may be insidious or delayed in its manifestations and expectant observation for at least seven days should be carried out where it is suspected. Traumatically ruptured spleen, as an isolated injury, does not result in great blood requirement, great morbidity or mortality. These may result from other injuries sustained in the accident. Peritoneal cannula tap or lavage is more effective in making a diagnosis of hemoperitoneum than four quadrant peritoneal tap or isolated needle tap.

Search terms: Spleen injuries / Medical treatment; Spleen injuries / Shock (pathology); Abdominal injuries /Spleen injuries; Spleen injuries /Age factors; Spleen injuries /Multiple injuries; Spleen injuries /Fatalities; Spleen injuries / Diagnosis

AVAILABILITY: *In* HS-008 596

HS-008 587 Fld. 1/2

DECLINE IN AUTOMOTIVE COLLISION INJURIES: A TEN YEAR COMPARISON OF CLINICAL CASES

by Arnold W. Siegel; Dale E. Runge; Alan M. Nahum

California Univ., Los Angeles, C18600

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p185-95

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

This paper is an overview to indicate the reduction in injuries that has resulted from application of the Safety Standards as well as from efforts of the automotive industry. The ratio of total injuries per occupant remained the same, but the ratio of moderate or greater injuries per occupant declined over 50%. With the exception of hood penetration, side impact, and rollover collisions, higher impact speed and greater vehicle deformation must be present in collisions involving current domestic vehicles to produce injuries similar to those observed in earlier model vehicles. The shift of position of injury producing components in the vehicle interior demonstrates the overall effect of industry and government efforts. The data also suggest that two areas, side impact and rollover protection, are principal collision areas that must be improved.

Search terms: Injury prevention / Safety standards; Vehicle age /Injury severity; Collisions /Statistics; Injury severity /Statistics; Seat belt use / Statistics; Seat position /Injuries; Interior design /Injury prevention; Side impact collisions /Injuries; Windshields /Injuries; Interior design /Injury causes; Injury causes /Statistics; Injuries by body area /Statistics

AVAILABILITY: *In* HS-008 596

HS-008 588 Fld. 1/2

IMPACT INJURY TOLERANCES OF INFANTS AND CHILDREN IN FREE-FALL

by Richard G. Snyder

Michigan Univ., Ann Arbor. Highway Safety Research Inst., M40800

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p131-64

36 refs

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

Thirty-four cases of child free-fall trauma were intensively investigated for both physical factors and resulting medical sequelae. Factors considered in the study were: relationships of age and sex; impacted surface; impact velocity; body orientation; injury severity; and estimation of impact tolerance. The study offered one means of assessing the full range of infant and child tolerance to abrupt deceleration unavailable by clinical, experimental, or modeling studies alone. Initial body

1/2 Injuries (Cont'd)

HS-008 588 (Cont'd)

orientation at impact was a major factor in child impact survival. Five cases of extreme lateral or transverse impact orientation (such as a child automotive occupant might be exposed to) were survived. Data on child impact trauma mechanisms and tolerances are essential to automotive occupant restraint design and interior impact protection.

Search terms: Impact severity / Children; Free falls /Child injuries; Child injuries /Impact tolerances; Sex factors in accidents /Child injuries; Age factor in accidents /Child injuries; Free falls /Impacts; Impact velocity /Child injuries; Injury severity /Child injuries; Human body precrash position /Child injuries; Impact severity /Infants; Impact severity /Statistics; Free falls /Infant injuries; Impact tolerances /Infant injuries; Age factor in accidents / Infant injuries; Injury severity / Infant injuries; Impact velocity / Infant injuries; Infants /Physiology; Children /Physiology

AVAILABILITY: *In* HS-008 596

HS-008 589 Fld. 1/2

UPPER THIRD OF FACE FRACTURES FROM VEHICLE ACCIDENTS

by Richard C. Schultz

Illinois Univ., Chicago. Coll. of Medicine, I13200

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p109-30

7 refs

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

Fractures of the upper third of the face are uncommon but often serious because of associated brain injury. These fractures most commonly result from automobile accidents (72%) but the incidence from motorcycle accidents has been increasing. The mechanism of injury is discussed. The compressible, air filled, energy absorbing facial bones serve as a decelerating device and protection to those vital structures which lie within and behind them. Extensive crush type injuries of the upper face can sometimes be seen with little damage to brain or eyes. Unique surgical techniques for reduction and fixation of various forms of facial fractures are described. Procedures and indications for the use of bone grafts and alloplastic implants for the reconstruction of secondary and residual deformities are given. Statistical references are made regarding the incidence of various types of upper face fractures and the forms of treatment indicated.

Search terms: Automobile accidents /Facial bone fractures; Motorcycle accidents /Facial bone fractures; Energy absorption /Facial bones; Facial bone fractures / Surgery; Facial bone fractures / Crushing; Facial bone fractures / Statistics

AVAILABILITY: *In* HS-008 596

HS-008 590 Fld. 1/2

THE ENIGMA OF WHIPLASH INJURIES

by John D. States; Martin W. Korn; James B. Masengill

Rochester Univ., N. Y. School of Medicine and Dentistry, R18600

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p83-108

21 refs

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

The purpose of this presentation is to review recent findings of the pathology of whiplash injury, to review engineering studies of instrumented crash tests of rear-end collisions, to present data from a clinical study of highway and racing accidents in which patients and the accident vehicles were examined, and to present preliminary data from an anthropometric study of the human neck. Conclusions were: neck injuries are most often caused by rear end impacts; other types of impacts require higher impact energies to produce neck injuries; seat back failure protects car occupants from neck injuries at impact speeds over 30 mph; women and small light weight people are more suseptible to neck injury; head rests and energy absorbing bumpers and rear body structures give promise of reducing neck injuries; seat belts increase the incidence and severity of neck injury when head rests are not used.

Search terms: Whiplash injuries / Rear end collisions; Whiplash injuries /Pathology; Neck injuries / Collisions; Neck injuries /Case reports; Neck injuries /Injury predicted from vehicle damage; Neck injuries /Accident types; Impact velocity /Neck injuries; Seat back failures /Injury prevention; Impact velocity /Injury severity; Energy absorbing rear structures /Injury severity; Seat belt use /Neck injuries; Head restraint use /Neck injuries; Neck injuries /Sex factors; Neck injuries /Human body size; Neck / Anthropometry

AVAILABILITY: *In* HS-008 596

HS-008 591 Fld. 1/2

CERVICAL SPINE INJURIES

by Tonu M. Kiesel; Roger L. Frerichs; Edward L. Seljeskog

Hennepin County General Hospital, Minneapolis, Minn., H08650

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p73-81

7 refs

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

Canadian statistics show that 10% of road accident deaths are due to, or associated with, spinal fractures. It is the purpose of this paper to discuss some of the mechanisms of injury

involved, to review the 10 year experience with these injuries at the Hennepin County General Hospital, to make some recommendations as to emergency management and transportation of these individuals, and to outline their management while hospitalized.

Search terms: Spinal fractures / Acceleration injuries; Neck injuries /Minneapolis; Neck injuries /First aid; Neck injuries / Medical treatment

AVAILABILITY: *In* HS-008 596

HS-008 592 Fld. 1/2

CAR CRASH INJURIES BY SEATING POSITION AND MILES TRAVELLED

by L. A. Foldvary; J. C. Lane

Australia. Road Research Board, Kew, Vic.. A76800; Australia. Dept of Civil Aviation, Melbourne, Vic., A75900

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p17-72

8 refs

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969. Previously announced in *Highway Safety Literature* as HS-007 170.

This paper studies the risk connected with the various seating positions in cars. An attempt is made to measure the risk relative to exposure, expressed in miles performed by passenger cars, including station wagons, and in some instances taxis; two and three-wheeled vehicles, and all commercial vehicles are excluded. The study area is Metropolitan Brisbane (Queensland), the year 1961. The types of risks studied include: (1) the risk of accident involvement while various seating positions are occupied; (2) the risk of being killed, or injured, while occupying various seating positions. Findings indicate the highest percentage of casualties is produced by the front left seat, and the lowest by the rear center seat; the driver's seat had the lowest front-seat ratio.

Search terms: Statistical analysis / Accident data; Seat position / Accident rates; Injuries /Seat position; Accident risks /Seat position; Accident data /Australia; Fatalities /Seat position; Vehicle mileage /Accident risks

AVAILABILITY: *In* HS-008 596

1/3 Investigation and Records

HS-008 593 Fld. 1/3

THE HIDDEN MENACE ON TODAY'S HIGHWAYS

by John Burke

Published in *California Highway Patrolman* v29 n3 p10, 72 (May 1965)

The hidden menace is said to be the driver, who is responsible for most accidents. The roles of tailgating, unsafe vehicle condition, excessive speed, and night driving are discussed. The difficulty of analyzing accident statistics to determine accident causes is outlined.

Search terms: Accident causes / Tailgating; Accident causes / Defective vehicles; Accident causes /High speed; Night driving / Accident factors; Accident data / Accident causes; Accident responsibility /Drivers

HS-008 594 Fld. 1/3

TRAFFIC CONTROL AND ROADWAY ELEMENTS: THEIR RELATIONSHIP TO HIGHWAY SAFETY. PT. 1

Automotive Safety Foundation, Washington, D. C., A82200

Published in *Traffic Safety Research Review* v7 n3 p9-18 (Sep 1963)

19 refs

Relationships are discussed between accident rates and selected aspects of the driving environment, including traffic volume, time of day, congestion, type of highway, travel time, rural versus urban environments.

Search terms: Accident rates / Traffic volume; Accident rates / Time of day; Accident rates /Traffic congestion; Accident rates /Highway characteristics; Accident rates / Travel time; Accident rates /Urban accidents; Accident rates /Rural accidents; Accident causes

HS-008 595 Fld. 1/3; 1/2

FLEXION–TORSION NECK INJURY IN REAR IMPACTS

by Jaakko K. Kihlberg

Cornell Aeronautical Lab., Inc., Buffalo, N. Y. Automotive Crash Injury Research. C67800

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p1-16

Contract FH-11-7098; CAL-6901-G129

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969. Previously announced in *Highway Safety Literature* as HS-800 229.

Factors which must be considered simultaneously in exploring the etiology of the whiplash type injury are: occupant age, sex, and height, and performance of the front seat in the impact. The results from this study are as follows: neck injury was more frequent among front seat passengers than among rear seat passengers; drivers did not differ substantially from their rear seat passengers; for adult occupants, a slight correlation, most marked for male rear seat occupants, was shown between neck injury and height; rearward bending of seat back or seat track damage was associated with a lower frequency of neck injury; neck injury frequency among women was up to twice as high as among men.

Search terms: Whiplash injuries / Etiology; Whiplash injuries /Front seat passengers; Whiplash injuries / Rear seat passengers; Whiplash injuries /Drivers; Whiplash injuries / Height; Front seat damage /Whiplash injuries; Whiplash injuries /Males; Whiplast injuries /Females; Accident investigation /Whiplash injuries; Injury research /Whiplash injuries; Rear end collisions /Whiplash injuries

AVAILABILITY: NTIS; also *in* HS-008 596

HS-008 596 Fld. 1/3; 1/2; 3/1

PROCEEDINGS OF THE THIRTEENTH ANNUAL CONFERENCE OF THE AMERICAN ASSOCIATION FOR AUTOMOTIVE MEDICINE, OCTOBER 16 AND 17, 1969, MINNEAPOLIS, MINNESOTA

American Assoc. for Automotive Medicine, Salem, N. J., A24900

1969 376p 224 refs

Prepared in cooperation with Michigan Univ. Highway Safety Research Inst., General Motors Corp., and American Motors Corp.

Papers and a panel discussion presented at the conference are given. Subjects covered are: neck injuries, statistics of car crash injuries, face fractures, impact injury tolerances of children, restraint systems, driver education, alcohol effects on driver performance and accidents, driver alertness, pedestrian visibility, splenectomy, and emergency services.

Search terms: Neck injuries /Rear end collisions; Injuries /Seat position; Vehicle miles /Accident risks; Spinal fractures /Acceleration injuries; Whiplash injuries /Pathology; Facial bone fractures /Motor vehicle accidents; Restraint systems /Injury prevention; Child injuries /Impact tolerances; Injury prevention /Safety standards; Driver education; Child restraint systems /Design; Infant restraint systems /Design; Air bag restraint systems /Occupant protection; Driver performance /Blood alcohol levels; Pupil responses / Vigilance tests; Pedestrian visibility /Reflecting surfaces; Spleen injuries /Medical treatment; Emergency medical services; Motorcycle operator fatalities /International aspects; Pedestrian fatalities / International aspects; Truck accidents /Driver intoxication; Alcoholism /Accident causes; Blood alcohol levels /Alcohol laws; Alcoholism /Psychological factors; Alcoholism /Medical treatment; Public opinion /Drinking drivers; Conferences

AVAILABILITY: (*Includes* HS-008 585-92; 008 595; 008 600-609; 008 611; 008 616-619)

HS-008 597 Fld. 1/3; 1/4

TRAFFIC CONTROL AND ROADWAY ELEMENTS: THEIR RELATIONSHIP TO HIGHWAY SAFETY. PT. 2

Automotive Safety Foundation, Washington, D. C., A82200

Published in *Traffic Safety Research Review* v8 n1 p10-25 (Mar 1964)

35 refs

Relationships are discussed between accident rates and selected aspects of the driving environment, including number of lanes, lane width, highway shoulders, pavement markings, medians, bridges, road surfaces, and rumbler pavements.

Search terms: Accident rates / Traffic lanes; Accident rates /Road shoulders; Accident rates /Pavement markings; Accident rates /Medians; Accident rates /Bridges; Accident rates /Road surfaces; Accident rates /Rumble strips; Accident causes; Accident location

HS-008 598 Fld. 1/3; 1/4

TRAFFIC CONTROL AND ROADWAY ELEMENTS: THEIR RELATIONSHIP TO HIGHWAY SAFETY. PT. 3

Automotive Safety Foundation, Washington, D. C., A82200

Published in *Traffic Safety Research Review* v8 n3 p74-83 (Sep 1964)

25 refs

Relationships are discussed between accident rates and selected aspects of the driving environment, including alignment, curvature, and gradient of the road; sight distance; interchanges; ramps.

Search terms: Accident rates /Road grades; Accident rates /Road curves; Accident rates /Highway characteristics; Accident rates /Ramps; Accident rates /Sight distances; Accident rates /Interchanges; Accident causes; Accident location

HS-008 599 Fld. 1/3; 1/4

TRAFFIC CONTROL AND ROADWAY ELEMENTS: THEIR RELATIONSHIP TO HIGHWAY SAFETY. PT. 4

Automotive Safety Foundation, Washington, D. C., A82200

Published in *Traffic Safety Research Review* v9 n1 p16-25 (Mar 1965)

25 refs

Relationships are discussed between accident rates and selected aspects of the driving environment, including intersections, intersectional traffic control, four way stops, right and left turning, directional signs, and traffic signals.

Search terms: Accident rates / Intersections; Accident rates /Traffic control; Accident rates /Traffic signals; Accidents rates /Right turns; Accident rates /Left turns; Accident rates /Four way stop signs; Accident rates /Direction signs; Accident location; Accident causes

HS-008 600 Fld. 1/3; 3/1

PROPOSED ALCOHOL RELATED AUTO CRASH CONTROL PROGRAM

by James W. Halvorson

Minnesota State Medical Assoc., Zumbrota. Automotive Injuries Committee, M48200

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p368-72

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

Describes attempts to overcome apathy amd ambivalence of public attitude toward drunk drivers by physicians.

Search terms: Alcoholism / Accident causes; Drinking drivers / Accident causes; Public opinion / Drinking drivers; Driver license suspension /Drinking drivers; Physicians

AVAILABILITY: *In* HS-008 596

HS-008 601 Fld. 1/3; 3/11; 3/3

THE OTHER ROAD USERS

by G. M. Mackay

Birmingham Univ., Warwick (England). Dept. of Transportation and Environmental Planning, B16800

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p327-45

19 refs

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

This paper has touched briefly on some of the national differences in pedestrian and rider accident rates. Pedestrians are essentially an urban problem whereas motorcycle riders have accidents in considerable numbers in rural areas. The kinematics of their impacts are discussed, and then the nature of their injuries reviewed briefly. The importance of head injury is emphasized. Data are given on the sources of injury in terms of impacts with vehicles and with the road surface; the importance of the primary vehicle impact is illustrated. For pedestrians the various parts of cars which cause injury are discussed. Examples of accidents involving pedestrians and riders are given to illustrate these various results.

Search terms: Pedestrian fatalities /International aspects; Motorcycle operator fatalities / International aspects; Motorcycle power /Accident rates; Fatalities / International aspects; Bicycle rider fatalities /International aspects; Kinematics /Impacts; Impact velocity /Accident severity; Motorcycle operator injuries; Pedestrian injuries; Pedestrian vehicle interface /Injuries; Motorcycle road interface /Injuries; Great Britain; Survival /Time factors; Motorcycle passenger injuries; Injuries by body area /Statistics

AVAILABILITY: *In* HS-008 596

3/0 HUMAN FACTORS

3/1 Alcohol

HS-008 602 Fld. 3/1; 3/4

EFFECTS OF MODERATE BLOOD ALCOHOL LEVELS ON AUTOMOBILE PASSING BEHAVIOR

by William O. Light; Charles G. Keiper

Environmental Control Administration, Providence, R. I. Injury Control Research Lab., E17300

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p239-67

15 refs

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

Sixteen clinically normal individuals drove in an optical driving simulator in both a non-alcohol and an alcohol condition. In both the 0 mg% (.00%) and the 90 mg% (.09%) blood alcohol level conditions, each subject was given 60 trials in which he was required to make and execute a decision to pass or to continue following a lead car. During the alcohol condition, subjects not only attempted and completed significantly more passes but also experienced more accidents. Lateral control of the vehicle was significantly changed with increased deviation from the center track when subjects performed under the alcohol condition. Mean decision-reaction times increased under alcohol as did error scores on a test of eye-hand coordination. Results suggest that effects of moderate levels of blood alcohol must be examined as they affect perceptual motor skills, risk taking behavior, and decision processes involved in operating a motor vehicle.

Search terms: Driver performance /Blood alcohol levels; Drinking drivers /Accident risks; Driving simulation /Drinking drivers; Passing /Drinking drivers; Driver behavior research /Blood alcohol levels; Decision making /Blood alcohol levels; Motor skills /Blood alcohol levels; Risk taking /Blood alcohol levels; Driver behavior research /Drinking drivers; Driver behavior research /Driver intoxication

AVAILABILITY: *In* HS-008 596

HS-008 603 Fld. 3/1

ALCOHOLISM SHOULD BE A REPORTABLE DISEASE. A PANEL DISCUSSION. INTRODUCTORY REMARKS

by David J. Buran

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p355

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

The use of alcohol by drivers and pedestrians leads to some 25,000 deaths and a total of at least 800,000 auto crashes in the United States each year according to a report last year by the National Highway Safety Bureau. Reports such as this have led the Committee on Automotive Injuries of the State Medical Society to focus on the public health and preventative medicine aspects of automobile crashes, particularly as they relate to alcoholism. Only 4 percent of American drivers are heavy drinkers but they are reported as responsible for at least half of the single vehicle accidents in which the drivers die and almost half the fatal accidents including more than one vehicle.

Search terms: Alcoholism / Accident causes

AVAILABILITY: *In* HS-008 596

HS-008 604 Fld. 3/1

ALCOHOLISM AND GENERAL DRUG ABUSE

by Alexander E. Ratelle

Methodist Hospital, Minneapolis, Minn., M25850

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p360

3/1 Alcohol (Cont'd)

HS-008 604 (Cont'd)

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

The absorption of any drug when taken in combination with alcohol is unpredictable, but usually accelerated. Effect on judgement and motor performance is also unpredictable, but always to a negative degree. Awareness of this interplay of clinical and toxic effects places the physician in an active role in accident prevention.

Search terms: Alcoholism / Psychological factors; Drugs

AVAILABILITY: *In* HS-008 596

HS-008 605 Fld. 3/1

PLANNING AND DEVELOPMENT OF AN ALCOHOLIC TREATMENT CENTER IN A COMMUNITY GENERAL HOSPITAL

by George A Mann

Saint Mary's Alcoholic Treatment and Rehabilitation Center, Minneapolis, Minn., S02770

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p361-7

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

By using the experience we have gathered during the planning and implementation of this unit there would seem to be a number of valid conclusions we can draw. It is possible for a private general hospital to function as an effective alcohol treatment and rehabilitation facility. Medical, paramedical, clerical, and lay therapists can function effectively as a team within a community hospital. The alcoholic patient can be treated within a general hospital without any isolation or restriction of movements without any disruption of normal hospital routine. Our patients are allowed almost complete freedom of motion within the confines of the hospital.

Search terms: Alcoholism /Medical treatment; Alcoholism / Rehabilitation

AVAILABILITY: *In* HS-008 596

HS-008 606 Fld. 3/1; 1/3

ALCOHOL RELATED AUTOMOBILE CRASH PROBLEMS

by James W. Halvorson

Minnesota State Medical Assoc., Zumbrota. Automotive Injuries Committee, M48200

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969. p356-9

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

Considers the need for changing law enforcement and laws themselves to keep drinking drivers off the road.

Search terms: Alcohol laws / Enforcement; Breath analysis / Drinking drivers; Blood alcohol levels

AVAILABILITY: *In* HS-008 596

HS-008 607 Fld. 3/1; 1/3; 5/20

THE ROLE OF ALCOHOL IN FATAL COLLISIONS INVOLVING TRUCKS

by Julian A. Waller

Vermont Univ., Burlington. Coll. of Medicine, V04800

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, 347-54

5 refs

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

The role of alcohol was studied in fatal collisions in which drivers of large trucks and pickup trucks were involved either as fatally injured or surviving drivers. Drivers of large trucks almost always were the survivers, usually were not at fault, and probably had not been drinking in any of their crashes. The fatally injured drivers or pedestrians who initiated the crashes commonly had high blood alcohol concentrations. In contrast, drivers of pickup trucks more often were fatally injured in these crashes, frequently were responsible for their crashes and usually had high blood alcohol concentrations. Police reports were correct less than half the time with respect to the presence of alcohol when they stated that fatally injured drivers or pedestrians had not been drinking but were responsible for the crashes.

Search terms: Truck accidents / Drinking drivers; Truck accidents / Driver intoxication; Fatalities / Blood alcohol levels; Fatalities / California; Accident responsibility / Blood alcohol levels; Truck drivers / Driver intoxication; Pedestrian intoxication /Accident causes; Collisions /Fatalities; Collisions /Truck accidents; Police reports /Driver intoxication; Police reports /Pedestrian intoxication

AVAILABILITY: *In* HS-008 596

3/4 Driver Behavior

HS-008 608 Fld. 3/4

A TEST TO MEASURE ABILITY TO MAINTAIN ALERTNESS AND ITS APPLICATION IN ASSESSING THE AUTOMOBILE DRIVER

by Robert E. Yoss

Mayo Clinic, Rochester, Minn., M16300; Mayo Foundation, Rochester, Minn., M16310

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p269-92

9 refs
Grant NB-2003

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

Describes a test that can be applied to all persons as an objective measurement of their ability to maintain alertness. The test is based on the fact that

when a person is alert his pupils are large, when he is asleep they are small, and when wakefulness declines and pupils become smaller, characteristic pupillary waves appear. Examples of tracings and case histories are given.

Search terms: Driver behavior / Vigilance; Driver fatigue /Attention lapses; Problem drivers /Sleep; Narcolepsy; Pupil responses / Vigilance tests; Epilepsy /Vigilance tests; Driver fatigue /Medical treatment

AVAILABILITY: *In* HS-008 596

3/5 Lighting

HS-008 609 Fld. 3/5

OUTLOOK 70'S: DRIVER EDUCATION

by Joseph B. Shields

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p197-206

6 refs

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

As early as 1933 the State College High School in Pennsylvania introduced a course in Driver Education, and in the ensuing thirty-six years much change and expansion has occurred. In recent years the Highway Safety Act of 1966 has placed increased emphasis on the training of beginning drivers, retaining of problem drivers, and on the standardization and improvement of course content. Contemporary high school driver education courses are vastly improved, especially those using the "Four Phase" method of instruction. Programs of the 70's will place more emphasis on skid control, blowout recovery, winter driving, night driving, emergency situations, and the effect of alcohol and drugs. Carefully designed research needs to be done in the area of driver education techniques with emphasis on those techniques necessary to produce better and safer drivers.

Search terms: Driver education / Curricula; High school driving courses; Classroom driver instruction; Driving simulation; Behind the wheel instruction; Problem drivers / Driver education; Motorcycle operator education

AVAILABILITY: *In* HS-008 596

3/6 Maintenance

HS-008 610 Fld. 3/6; 5/3

MOTOR-SCOOTER TEST FOR NEVADA TEENS

by Howard Hill

Published in *Traffic Safety* v66 n9 p18-9 (Sep 1966)

A system of motor scooter licensing is described. Restricted licenses are granted to 14 and 15-year-olds; regular licenses are granted at 16. Motor scooter operators must take a five-part driving test, an eye examination, and a special written test.

Search terms: Motor scooters / Adolescent drivers; Driver license restrictions /Adolescent drivers; Driver licensing /Motor scooters; Driver licensing /Adolescent drivers; Driver licensing /Nevada; Vision tests /Adolescent drivers; Road tests /Adolescent drivers; Driver license examination /Adolescent drivers

3/11 Pedestrians

HS-008 611 Fld. 3/11

ACTUAL PEDESTRIAN VISIBILITY AND THE PEDESTRIAN'S ESTIMATE OF HIS OWN VISIBILITY

by Merrill J. Allen; Richard D. Hazlett; Herman L. Tacker; Ben V. Graham

Indiana Univ., Bloomington, I20400

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p293-9

8 refs

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

Over 1700 observations were made on the road involving actual pedestrians and cars. It was learned that out of 26 pedestrian observers, ages 18-35, the one pedestrian most pessimistic about his visibility closely estimated his true visibility of 175 feet. Each of the remaining 25 pedestrians estimated his visibility to be up to three times farther than it actually was. The average pedestrian thought he was visible at 343 feet.

Actual pedestrian visibility was enhanced from about 175 feet for normal dark clothing to about 790 feet by using reflectorized clothing. In the presence of headlight glare, black clothing was seen at about 167 feet while the reflectorized clothing was seen at 680 feet. The clothing was reflectorized with a 1" fabric tape outlining the collar and wrapped around the sleeves. The reflectance of the tape was 50 candles/ft^2/ft. candle of incident light.

Search terms: Pedestrian visibility / Reflecting surfaces; Road tests / Pedestrian visibility; Pedestrian visibility /Glare; Pedestrian visibility /Psychological factors

AVAILABILITY: *In* HS-008 596

4/0 OTHER SAFETY-RELATED AREAS

4/1 Codes and Laws

HS-008 612 Fld. 4/1; 4/6

UNGRATEFUL GUESTS

Anonymous

Published in *Journal of American Insurance* v41 n4 p5-7 (Sep-Oct 1965)

More than half the states have enacted laws called "guest statutes" which prohibit a passenger from suing his driver for negligence except in certain instances of flagrant misconduct. Such statutes attempt to strike a reasonable balance between the host's responsibility to be careful and the guest's assumption of risk. Arguments for and against these statutes are outlined, and the point of view of the insurance industry is discussed.

Search terms: Negligence /State laws; Liability /State laws; State laws /Accident compensation; Insurance industry

OF AUTOMOBILE DRIVING

by N. Rashevsky

Published in *Bulletin of Mathematical Biophysics* v22 p257-62 (1960)

The angular direction error made by the driver and the driver's reaction time are not constant but are randomly distributed. Instead of a critical speed, at which the car will jump off the road, we now find that for every speed there is a probability that the car will jump off the road, but this probability is vanishingly small for sufficiently low speeds. It increases rapidly for high speeds. Thus a more realistic picture of the process of driving is obtained. When the standard deviation of the distribution functions for the angle and the reaction time are very small, the expression obtained here reduces to the expression reported in a previous paper.

Search terms: Reaction time / Biophysics; Speed patterns / Mathematical analysis; Loss of control /Speed patterns; Driving tasks /Mathematical analysis; Driving tasks /Biophysics

4/8 Transportation Systems

HS-008 614 Fld. 4/8

TRAFFIC IN RELATION TO TOWN PLANNING

by C. D. Buchanan

Published in *Traffic Engineering & Control* v4 n10 p568-70 (Feb 1963)

Traffic engineers and town planners should give more recognition to the environmental aspect of the traffic problem. Aspects discussed include the relationship between traffic movement and the activities which are served by traffic; regional versus town planning; and accessibility.

Search terms: Urban planning; Transportation planning; Traffic flow; Regional planning; Traffic engineering; Environmental planning

HS-008 615 Fld. 5/4

NEW ROLES FOR PLASTICS IN DETROIT

Anonymous

Published in *Modern Plastics* v44 n2 p90-6, 172, 174, 176, 179 (Oct 1966)

The increased uses of plastics in the automotive industry are discussed, particularly the use of plastics for safety devices.

Search terms: Plastics /Automotive industry; Safety devices /Plastics

5/14 Occupant Protection

HS-008 616 Fld. 5/14

RESTRAINT SYSTEMS: HOW EFFECTIVE ARE THEY?

by D. J. Van Kirk

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p165-84

61 refs

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

Many facts, figures, and statistics are presented showing what occurs during an automobile accident, what restraint systems are available to the occupants of motor vehicles, and how effective they are. Each system is discussed and evaluated on its own merits in reducing injury to occupants. Flaws are pointed out when necessary. Percentage of seat belt usage, injury survival, and seat belt availability are given. It is noted that the effectiveness of any safety system component cannot be judged adequately except in the context of the entire system.

Search terms: Restraint systems / Injury prevention; Occupant kinematics /Secondary collisions; Seat belt use /Injury research; Shoulder harness usage /Injury research; Restraint system use / system use /Fetal death; Child restraint systems

AVAILABILITY: *In* HS-008 596

HS-008 617 Fld. 5/14

RESEARCH IN CHILD RESTRAINT DEVELOPMENT

by R. H. Fredericks

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p207-12

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

Describes the process by which Ford developed the Tot-Guard child seat and the various belt and rest combinations designed and studied before arriving at the final result.

Search terms: Child restraint systems /Design; Dummies / Children; Tot guard; Ford Motor Co.

AVAILABILITY: *In* HS-008 596

HS-008 618 Fld. 5/14

INFANT SAFETY CARRIER

by George W. Sierant

General Motors Corp., Warren, Mich. Engineering Staff, G08500

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p213-20

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

The Infant Safety Carrier is designed to help safeguard infants from injury in all automotive collisions regardless of direction of impact: frontal, angular, side, rear and roll-over. It is recommended for use by children who weigh up to twenty pounds. Elements of the restraint system are the automotive seat, standard lap belt and the

carrier which is of a double-shell molded plastic construction with integral adjustable straps. The infant carrier is positioned in the vehicle with the child facing rearward in a semi-reclining position and fastened in place with the standard lap belt.

Search terms: Infant restraint systems /Design; General Motors Corp. /Infant Safety Carrier; Impact tests /Infant restraint systems

AVAILABILITY: *In* HS-008 596

HS-008 619 Fld. 5/14

AIR PILLOW OCCUPANT RESTRAINT SYSTEM – AUTOMATIC AND EFFECTIVE

by D. Peter Hass

Eaton Yale and Towne, Inc., Cleveland, Ohio, E02400

Published in *Proceedings of the 13th Annual Conference of the American Assoc. for Automotive Medicine*, 1969, p221-37

Presented at the 13th annual conference of the American Assoc. for Automotive Medicine, Minneapolis, Minn., 16-17 Oct 1969.

Two aspects of Air Pillow Occupant Restraint Systems are discussed: (1) The means of supporting and dissipating the kinetic energy of the occupant of a crashing vehicle. (2) The means employed to automatically deploy the pillow system in response to a crash intensity impact.

Search terms: Air bag restraint systems /Occupant kinematics; Passive restraint systems /Occupant protection; Air bag restraint systems /Sensors

AVAILABILITY: *In* HS-008 596

NHTSA DOCUMENTS

NHTSA Contractors Reports

HS-800 315 Fld. 5/4

BASIC RESEARCH IN AUTOMOBILE CRASHWORTHINESS. SUMMARY REPORT

by Patrick M. Miller, ed.; Richard P. Mayor, ed.

Cornell Aeronautical Lab., Inc., Buffalo, N. Y., C67200

Nov 1969 139p 12 refs
Contract FH-11-6918
Report no. CAL-YB-2684-V-6

Nineteen full-scale crash tests were performed, five base line tests on the standard vehicle, two developmental tests to provide specific engineering information, and three within each of the four concepts pursued. The four vehicle modification series developed in the program are the engine deflection, forward structure modification, rear engine vehicle, and side impact modification concepts. Summary information on the structural crashworthiness of the standard and modified vehicles is presented.

Search terms: Crashworthiness / Automobile design; Impact tests / Crashworthiness; Engine deflection / Crashworthiness; Side impact collisions /Crashworthiness; Rear engine vehicles /Crashworthiness; Impact tolerances /Automobile design

AVAILABILITY: NTIS

HS-800 319 Fld. 5/14; 5/4

RESEARCH IN IMPACT PROTECTION OF AUTOMOBILE OCCUPANTS. TECHNICAL REPORT

Cornell Aeronautical Lab., Inc., Buffalo, N. Y., C67200

Jul 1969 324p 27 refs
Contract FH-11-6955
Report no. CAL-VJ-2672-V-1

A research program was conducted with the objective of establishing a factual basis for future performance requirements for vehicle interiors. Actual highway accidents were reviewed in detail from a statistical viewpoint to establish interior target areas for given components of the human body and to rank the injury severities produced by the contacts. Engineering analyses, utilizing a computer simulation of the crash victim and experiments with an accelerator sled, were performed to supplement the statistical data and to determine the energy absorption and load deflection requirements for the various impact areas. It is concluded that significant improvements can be made in the protection level provided by existing vehicle interiors. Performance requirements are recommended for several components.

Search terms: Occupant protection /Interior design; Accident investigation /Statistical analysis; Secondary collisions /Interior design; Secondary collisions /Injury severity; Secondary collisions / Computerized simulation; Energy absorption /Computerized simulation; Impact severity /Computerized simulation; Impact sleds /Impact tolerances; Performance characteristics /Interior design; Impact protection /Interior design; Deflection /Impact tolerances

AVAILABILITY: NTIS

HS-800 324 Fld. 5/9

SUMMARY REPORT ON VEHICLES IN USE, AND STATE COMPULSION VEHICLE INSPECTION. VOL. 1

by F. B. Oldham

Automobile Club of Missouri, St. Louis, A79300

6 Aug 1970 26p
Contract FH-11-7330

Data on vehicles in use, data from state compulsory inspection facilities, and data concerning the reasons for rejection of vehicles were studied. The relative worth of the platform type of brake tester, commonly used for state inspection, and the high speed roller tester used in many diagnostic clinics were compared. Types of defects for which vehicles were rejected are analyzed.

Search terms: Motor vehicle inspection /Missouri; Defective vehicles; Brake inspection; Diagnostic centers /Motor vehicle inspection

AVAILABILITY: NTIS

HS-800 325 Fld. 5/9

TECHNICAL REPORT ON VEHICLES IN USE, AND STATE COMPULSION VEHICLE INSPECTION. VOL. 2

by F. B. Oldham

Automobile Club of Missouri, St. Louis, A79300

6 Aug 1970 309p
Contract FH-11-7330

NHTSA Contractors Reports (Cont'd)

HS-800 325 (Cont'd)

Data on vehicles in use, data from state compulsory inspection facilities, and data concerning the reasons for rejection of vehicles were studied. This volume presents statistics on reasons for rejections and most common defects for both foreign and domestic vehicles.

Search terms: Motor vehicle inspection /Missouri; Defective vehicles /Statistics; Foreign vehicles /Defective vehicles

AVAILABILITY: NTIS

HS-800 326 Fld. 5/9

REPRODUCTION OF DIAGNOSTIC CENTER MASTER PRINTOUT. VOL. 2, SECT. 6

Automobile Club of Missouri, St. Louis, A79300

6 Aug 1970 500p
Contract FH-11-7330

Data from diagnostic centers are reproduced. The statistics include information on defects and rejections of the vehicles inspected. Some sociological data on the drivers are also included.

Search terms: Motor vehicle inspection /Missouri; Defective vehicles /Statistics; Drivers / Sociological factors; Diagnostic centers /Statistics

AVAILABILITY: NTIS

HS-800 327 Fld. 5/9

DIAGNOSTIC CENTER MASTER PRINTOUT. VOL. 2, SECT. 6, PT. 2

Automobile Club of Missouri, St. Louis, A79300

6 Aug 1970 601p
Contract FH-11-7330

Data from diagnostic centers are reproduced. The statistics include information on defects and rejections of the vehicles inspected. Some sociological data on the drivers are also included.

Search terms: Motor vehicle inspection /Missouri; Defective vehicles /Statistics; Drivers / Sociological factors; Diagnostic centers /Statistics

AVAILABILITY: NTIS

HS-800 328 Fld. 5/9

REPRODUCTION OF PMVI PRINTOUTS. VOL. 2, SECT. 7

Automobile Club of Missouri, St. Louis, A79300

6 Aug 1970 258p
Contract FH-11-7330

Date from the Missouri state periodic motor vehicle inspection system are presented. The statistics include information on defects and rejections of the vehicles inspected.

Search terms: Motor vehicle inspection /Missouri; Defective vehicles /Statistics; Motor vehicle inspection /Statistics

AVAILABILITY: NTIS

HS-800 365 Fld. 4/2; 2/0

COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY: GUIDE 3. ORGANIZATION AND ADMINISTRATION

by Mel D. Powell; Michael K. Gemmell; Donald Murray; Warren P. Howe

National Assoc. of Counties Research Foundation, Washington, D. C., N06600

Sep 1970 24p
Contract FH-11-7091

Fragmentation of effort and lack of coordination have retarded traffic safety efforts. There is a need for a centralization of programs at least to the point where a single coordinating body would be empowered to oversee and guide multiple program activities as conducted by dispersed and overlapping agencies. A number of programs which have been successful at the local government level are described. Four organizational alternatives or models based on the local coordinator and the traffic safety multi-disciplined organization are proposed. Their basic advantage is that of providing a structure of coordination that can be adapted to a city, county, or multi-jurisdiction body.

Search terms: Highway safety / Local government; Safety programs /Local government; Community support /Highway safety; Community support /Safety programs

AVAILABILITY: NTIS

HS-800 366 Fld. 4/2; 2/0

COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY. GUIDE 4. AREAWIDE APPROACHES

by Mel D. Powell; Michael K. Gemmell; Donald Murray; Warren P. Howe

National Assoc. of Counties Research Foundation, Washington, D. C., N06600

Sep 1970 20p
Contract FH-11-7091

The benefits of local government multi-jurisdictional programs in traffic safety are discussed. Many local governments have found it effective to cooperate with neighboring jurisdictions, pool existing resources, and act together to attract other resources.

Search terms: Highway safety / Local government; Safety programs /Local government; Community support /Highway safety; Community support /Safety programs

AVAILABILITY: NTIS

executive summary

A SYNOPSIS OF A RECENTLY RELEASED NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION RESEARCH REPOR

POST-CRASH COMMUNICATIONS

The over-all purpose for this study was to determine the requirements and design concepts for a Motor Vehicle Post Crash Communications System (MVPCCS).

Contract FH-11-7335
AIL, A division of
CUTLER-HAMMER
Deer Park, New York 11729
DOT/HS-800 289
PB-194 974

Award amount: $39,480.00
Date Report Due: 7/15/70
Date Report Rec'd: 9/18/70
Printed: 10/9/70
Release Date: 10/26/70

Objectives

- To identify the requirements for motor vehicle Post-Crash Communication. Areas of consideration include detection of emergencies, response, and warning approaching motorists of the existence of a crash.
- To review and analyze the Post-Crash Communications problems in rural and urban areas, as they relate to detection, emergency response, and crash warning.
- To determine where and how communications can best serve to alleviate the problems associated with Post-Crash Factors.
- To determine functional requirements for Post-Crash Communications in those areas identified in Paragraph three above. Where possible, preliminary technical specifications were to be furnished.

  To recommend the most practical design concept for short-range development of crash-initiated and manual signal devices for motor vehicles.

Background

In response to the highway accident problem, the U. S. government, interested organizations, and concerned individuals have initiated programs of research and development designed to study the problem and initiate effective countermeasures to reduce the toll of highway accidents. The thrust of these programs has been in the three areas which define the highway accident; the pre-crash, crash, and post-crash phase. Emphasis has been on the pre-crash and crash phases, where measures such as driver training and education, driver licensing, solving the alcohol problem, improved highway design and geometrics, improved vehicle design and crash worthiness, etc., have been initiated and are now beginning to have a positive impact on amelioration of the motor vehicle accident problem.

Given the present situation of limited and dispersed response resources it is evident that a need exists to greatly improve emergency services throughout the nation. Since aspects of communication are potentially involved in all phases of emergency services, one way to improve these services is through an effective use of communications in the post-crash phase.

The Problem

The Post-Crash Phase of highway crashes includes all factors after the occurrence of a crash and takes into account "... the circumstances that determine the continuing survival and recovery of crash victims." The importance of the post-crash phase, except in the case of instantaneous death or irreversible injury, is the long-range result of bodily injury that can be lessened by approporate measures, including optimizing on-the-site first aid, facilitating emergency transportation of the injured, and early clinical care. All

aspects of the post accident problem must be considered, including detection and notification of the emergency, communication, acquisition, transport, medical care, and final disposition.

There are two basic sequences of activities that may be required in the post-crash phase of highway accidents, dependent on the severity and type of incident. These are treatment of the accident victim(s) and /or debris hazard control. In both cases, the sequence of activities have the common elements of Detection, Notification and Response.

- Detection includes the recognition of the occurrence of the incident, the location of the incident, and the nature, the severity, and the criticality of the incident. Detection generates the initial information to be communicated.
- Notification is the initial communication of the detected accident or incident to the proper authorities, agencies and/or potentially involved parties.
- Response is the assembly and dispatch of the proper aid to the incident site (resources allocation). During the response stage, subsequent communication may occur. Thus, elements of communication are potentially involved in all aspects of post-crash sequences.

Major Findings, Conclusions and Recommendations

Findings

1. Problem Definition

a. Physical Environment

The physical environment, including the road that the incident occurs on, and the area adjacent to the road, predicates MVPCCS design and application. Roads may be classified by access control and rural-urban, leading to a classification scheme in terms of 4 cases as follows: Case 1 – Urban controlled access (Freeways); Case 2 – Rural controlled access (Freeways); Case 3 – Urban uncontrolled access (City streets); Case 4 – Rural uncontrolled access (County two-lane roads).

b. Post-Crash Incidents

Post-crash incidents consist of motor vehicle accidents and emergency stops remaining on the roadway.

- Accidents

There were 14,600,000 reported motor vehicle accidents in the United States in 1968, three-quarters of which occurred in urban areas. These accidents resulted in 55,200 fatalities, with over 50 percent on Case 4 roads; and 2,600,000 injuries, with about half occuring on Case 3 roads. They cost the U.S. economy in excess of ten billion dollars.

Accidents consist of three basic types, single vehicle collisions and non-collisions, two-vehicle collisions, and chain-reaction collisions. About one-third of all accidents are single-vehicle accidents, and result in two-thirds of all fatalities. Passenger cars are involved in 85 percent of all motor vehicle accidents, and trucks are involved in 11 percent of all accidents.

- Medical Factors and Medical Emergencies

Of the 12 percent of all accidents which lead to medical involvement, the head and face are most often injured and are the most prevalent body parts involved in fatalities. By injury type, contusions, abrasions and lacerations comprise over one-half of all injuries. In terms of severity, 80 percent of all injuries are slight or minor. Thus, in 20 percent of all injury accidents, there is an urgent medical emergency where the victim may not be physically or psychologically able to personally call for aid. The time lag between the occurrence of the injury, accident and the receipt of professional medical aid may be long. In about one-quarter of all fatal injuries, this lag is critical to the survivability of the victim. This lag is also significant to severe and moderate injuries, where there is a potential for worsening of the injury.

- Emergency Stops

  There are 126 million emergency stops per year on U.S. roads, most occurring on Case 4 roads. When accidents remaining on the roadway are summed with emergency stops remaining on the roadway, it is found that 15 million incidents remain on the roadway each year, about half on Case 3 roads. This results in an increased likelihood of chain-reaction accidents, (there were 1,460,000 chain-reaction accidents in 1968), and increased delay to other motorists, applicable to Case 1 and Case 2 roads where 8.6×10^8 hours of yearly delay is experienced.

c. Response

Response to post-crash incidents was evaluated in terms of detection, notification and dispatch of resources to the incident site. Time lags in detection and notification were found to vary from 10 minutes in urban sections to almost an hour in rural locations. Detection and notifications were found to be accomplished by passers-by, involved parties, or police patrol. Resources were found to be lacking or widely dispersed in rural areas, leading to additional extensive time delays. A lack of inter-resource communications capability was noted.

. MVPCCS Systems Objectives and Benefits

a. Objectives

Based on the problem definition, it was determined that the primary way in which an MVPCCS could help to alleviate the post-crash problem was through more rapid detection and notification of post-crash incidents, thereby decreasing the time-lag both in the response authorities and to motorists in the vicinity of the post-crash incident. The following systems objectives were developed:

- Immediate detection of post-crash incidents
- Location of post-crash incidents
- Identification of post-crash incidents in terms of their nature and urgency
- Immediate notification of post-crash incidents
- Warning approaching motorists of the existence of post-crash incidents
- Facilitate inter- and intra-response communications
- Enhance call for aid by the disabled motorist
- Provide supplemental communications to motorists
- Provide tie-in with other existing or proposed highway information, surveillance and control systems

b. Benefits

The benefits of a MVPCCS were determined to be:

- Reduction in Highway Fatalities – As many as 1,350 yearly occupant fatalities could be prevented, given proper medical care.
- Reduction in Injury Severity – As many as 60,000 yearly occupant injuries could be maintained at their initial level, given proper medical care.
- Reduction in Chain Reaction Accidents – 10 percent of the chain-reaction accidents found to occur could be prevented, saving an additional 400 lives.
- Reduction in Delay to Involved Motorists – As much as 2 billion hours of annual delay could be prevented.
- Increased Effectiveness of Available Resources.
- Reduction in Delay to Disabled Motorists – As much as 70,000,000 hours of annual delay to disabled motorists could be prevented.
- Increased Safety, Comfort and Efficiency of Road Users

3. MVPCCS Requirements

The MVPCCS requirements developed were:

- Incident detection with minimum time lag
- Incident location in time
- Incident location in space to a resolution based on physical environment
- Incident identification by type
- Incident identification by severity and urgency
- Incident notification to authorities and motorists in vicinity
- Capability for subsequent communications
- Compatibility with other highway electronic systems
- Mandatory implementation
- Evolutionary implementation
- Vehicle associated requirements:
  - Automatic-initiation-on-crash mode
  - Manual initiation mode
  - Operate in all accident modes
  - Be crash proof
  - Be valid
  - Be tamper-proof
  - Be fail-safe
  - Have a receive mode
  - Be inspectable
  - Be maintainable
  - Be reliable
  - Be inexpensive
- Road/environment associated requirements:
  - Operate in all climatological environments
  - Operate in all physical environments
- Resource-associated requirements
  - Central response authority
  - Central response area
  - Centralized communications centers

4. Design And Application

a. Survey of Technology

- Detection

  The only sensor capable of timely reliable detection of the entire accident spectrum is a vehicle-mounted impact sensor.

- Location

  Location must be by electronic means, utilizing a vehicle-mounted crash-initiated beacon and one of several types of remote locating schemes.

- Notification

  Once a signal is located and detected, notification is accomplished.

b. System Design

- On-Vehicle Subsystem

  Configured to automatically sense and transmit the occurrence of a crash and to provide a means for vehicle occupants to manually indicate and transmit the need for aid in response to non-crash emergencies. To receive information relating to the incidence of emergencies in the vicinity and to provide feedback from the remote subsystem that help is on the way. Includes an antenna committed to crash-initiated transmission which is not deployed until a crash has occurred.

- Remote Subsystem

  Configured to automatically detect and locate the on-vehicle signal, to determine the nature of the emergency from the characteristics of the signal, to notify the proper authorities, and to provide a feedback link to the affected vehicles. Techniques for location may be either area of linear, or, depending on nature of physical environment a mix of the two. Frequency allocation is required.

- Costs

  Costs were calculated for roadside telephones, citizens-band radio, and four MVPCCS systems: Area Transmit; Area Transmit and Receiver; Linear Transmit; and Linear Transmit and Receive. Costs consisted of vehicle costs and external costs.

Evaluation of MVPCCS Solutions

a. Cost-Benefit Analysis

No MVPCCS solutions were found to be very cost-effective. Roadside telephones were cost-effective on urban freeways and ranked highest in the urban areas. The MVPCCS Area Transmit system was found to rank highest in rural areas and nationwide.

b. Compatability

The MVPCCS concept is capable of being integrated with proposed electronic surveillance and communications and control systems that would reduce costs by several orders of magnitude.

onclusions

- Feasibility

  The MVPCCS concept is presently technologically feasible within the state-of-the-art. The major technical obstacle is administrative (frequency allocation). However, none of the major MVPCCS components exists "off-the-shelf".

- Crash-Detection

  The only effective means fully responsive to the system objective of detecting the occurrence of a crash is by an automatic vehicle-mounted sensor. Any other configuration relying on the driver, passengers, passers-by, patrols or visual surveillance techniques are inadequate for the task.

- Locating Technology

  No single locating technology is considered optimum for all road and terrain characteristics. However, the on-vehicle sub-system can be designed to be fully compatible with both locating techniques studied.

- Notification

  The amount of information to be communicated between on-vehicle and remote subsystems is very small and can easily be accommodated by simple digital coding techniques. A voice link is not considered mandatory.

- Benefits Realizable

  Under present conditions, the potential benefits of the system are significant. However, a major portion of the time lag to the receipt of effective aid is attributable to lack in both quality and quantity of available resources. The greatest benefits in fatality reduction should be realizable in the rural areas where, however, resources are least adequate.

- Resource Management

  Present methods of allocating available resources do not take full advantage of their intrinsic potential.

- Total System Concept

  A system designed to render effective aid to the motorist goes beyond the functions of detection, location and notification. It includes features such as the upgrading of the quality of resources, and the proper management of their allocation.

- Cost-Effectiveness

  An independent MVPCCS does not appear to be sufficiently cost-effective to warrant its nationwide implementation.

However, benefits realizable in terms of lives saved and other social benefits are not absolutely amendable to qualification.

- Alternate Implementation Scheme

  System costs could be reduced by orders of magnitude if the MVPCCS were to be integrated with other contemplated highway surveillance, communications, and control systems. This approach may improve cost-effectiveness to the point where implementation is warranted.

- Short-Term Solutions

  The analysis indicated that a compromise solution to the problem is available only on urban freeways, where the utilization of roadside telephones could solve a major part of the problem in a cost-effective manner.

Recommendations

- Integration

  It is recommended that the requirements for MVPCCS be combined with those for highway surveillance, communications and control systems currently under consideration by other agencies.

- Short-Range Development

  The most critical component of the system is the emergency antenna. It is recommended that a detailed design effort be undertaken resulting in prototype hardware, and that such hardware be tested under simulated crash conditions. Since frequency characteristics directly influence antenna design, it is further recommended that a frequency be allocated for the intended function.

- Exploration of Technique

  Since many of the highway surveillance, communication, and control systems under consideration and/or test utilize magnetic loops as system components (e.g., ERGS, PAS, UTCS), it is recommended that a design and test program be initiated that will explore the feasibility of using these loops as part of an MVPCCS. The system might operate as follows: The loops generate a digital code indicative of their location, either continuously or upon interrogation. The vehicle-mounted subsystem stores this location when the car passes over the loop, simultaneously erasing the last stored code from its memory. Involvement in an emergency would cause the car-mounted transmitter to reradiate the stored code to a remote receiver. This technique results in location of the vehicle to an acceptable accuracy without the use of elaborate remote locating equipment.

- Time-Relationships

  Further study is needed to more precisely establish both injury/fatality time relationships and present detection to response time lags. This investigation will provide a basis for establishing criteria for resource related aspects of the system.

- Resource Improvement

  As part of the NHSB Emergency Medical Services Standard (U.S. Department of Transportation, National Highway Safety Bureau, 1968), it is recommended that additional emphasis be placed on the provisions for within-resource telecommunications, including hospital alert and vital function monitoring, to aid in rural areas where time lags are greatest.

- Resource Allocation

  It is recommended that further research be carried out with the objective of establishing definite guidelines and standards, including recommended organizations, operational procedures, and jurisdictional lines of responsibility for the management of available resources. This study should be define the characteristics and limits of such organizations tailored to specific locations.

- The study should further explore the potential for integration of such an organization into a system responsive to the emergency needs of a given area including such aspects as response to medical emergencies, natural disasters, fires, explosions, civil disturbances, and civil defense emergencies.

The Contract Manager has certified that the contractor's work has been satisfactorily completed and that all contractual obligations have been met.

The opinions, findings and conclusions expressed in this summary are those of the contractor and not necessarily those of the National Highway Traffic Safety Administration.

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